

# SIGMA XI QUARTERLY

Vol. X

JUNE, 1922

No. 2



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# SIGMA XI QUARTERLY

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## EDITORIAL COMMITTEE

Floyd Karker Richtmyer  
Edwin Emery Slosson

Henry Baldwin Ward  
Edward Ellery

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## EDITORIAL NOTES

Especial attention is called to the article by Dr. Weinstein, which covers a preliminary report of his investigations on the Sigma Xi foundation. It will be recalled that Dr. Weinstein was appointed by the Fellowship Committee of the Society to the first Sigma Xi fellowship. The outline of his proposed work appeared in the issue of the QUARTERLY for last December. He is carrying out his program in the laboratory of Professor T. H. Morgan at Columbia. A subsequent issue of the QUARTERLY will contain his full and final report.

It is hoped and urged that chapter members will study carefully the proposed new Constitution and make comparison with the present Constitution, a copy of which was sent every subscriber with the March issue of the QUARTERLY. Chapters should give one or more meetings in the autumn to a discussion of the proposed changes and be sure to send a delegate or delegates to the Boston Convention when the new Constitution will be up for action. The Committee on Revision, and especially its chairman, Professor Richtmyer, has gone into the matter thoroughly. The Executive Committee has given part of two sessions to its consideration and approves the changes. Active and Alumni members are directly concerned in this forward movement, one of the important steps in advance which have characterized the recent history of the organization.

This issue contains the report of the annual spring meeting of the Executive Committee. The business in hand required long

sessions. There are a number of institutions from groups in which information has been sought regarding the conditions necessary for the granting of a charter. The committee gave to each request very careful consideration. It reports to the convention only those petitions upon which, after thorough investigation it can recommend favorable action. The spring meeting of the committee is an important event for the society at large and the report of it shows to the chapters what is being done between conventions.

One of the interesting items of business at the Executive Committee meeting was the proposal of the American Association for the Advancement of Science that the Association and Sigma Xi hold a joint session at the Boston Convention. The committee voted approval of the plan. President Farrand of Cornell University has accepted its invitation to deliver the address on that occasion and that assures an inspiring meeting. Further announcements regarding the plans for the Boston Convention will appear in the next two issues of the *QUARTERLY*. The convention will be one of the most important the Society has held for many a year.

## THE SPRING MEETING OF THE EXECUTIVE COMMITTEE

The regular meeting of the Executive Committee was held in Cincinnati May 6.

Present: President Ward; Professors Pegram, Richtmyer, Stewart, Jones, Ellery.

Absent: Professors Eigenmann and McClung.

After considerable discussion regarding the time and place for the spring meeting, the following motion was made and carried unanimously:

Resolved, That the spring meeting of the Executive Committee in 1923 be held May 12 and 13 at a place to be decided upon later.

President Ward made a report of the installation of the chapter at McGill University.

Professor Jones gave a report of the installation of the chapter at Rutgers College and the State University of New Jersey.

Professor Ellery gave a report of the installation of the chapter at the University of Kentucky.

It was voted that:

Hereafter, when the secretary reports to the individuals concerned that action upon their petition for a charter has been favorable, he informs the petitioners that the installation must take place before March 15 following the Convention at which the charter was granted or be postponed until after October 15, except by special vote of the Executive Committee.

It was further voted that in connection with the installation of new chapters, the secretary should cooperate with the members of the new chapters in securing suitable publicity regarding the installation.

Professor Richtmyer and Professor Ellery were continued as the sub-committee on convention of the Executive Committee. Professor Richtmyer reported for the sub-committee that arrangements had been completed for a joint meeting of the American Association for the Advancement of Science and of Sigma Xi for Wednesday evening, December 27, and that President Farrand of Cornell University had accepted the joint invitation to speak on that occasion.

The sub-committee on convention was directed to proceed with the arrangement of plans for the Convention proper and for the annual dinner.

The secretary was directed to issue early notices to the chapters regarding the convention and the importance of sending delegates.

The Executive Committee voted approval of the president's action in providing a charter for Mayo Foundation Chapter in its new status as active chapter by using the former charter with statement attached declaring change of status from an alumni to an active chapter.

Approval was voted of the addition of the name of Professor Louis Vessot King to the charter members of the McGill Chapter.

A request was presented from the alumni chapter of the District of Columbia for authorization to elect members to the Society. The request was carefully considered. The committee voted that it is inadvisable to grant to alumni chapters authorization to elect members to the Society.

President Ward presented the matter of petitions from groups at several educational institutions.

President Ward reported correspondence with some twenty institutions from which inquiries had been received regarding a possible petition for a charter.

It was voted:

To publish in the official journal of the Society a list of the Sigma Xi Clubs and the names of the president and secretary of each. The secretary was directed to prepare a method of procedure to be followed in the formation of new clubs.

The secretary was directed to outline a blank form for use of petitioners for charters in sending preliminary information regarding the institution with which they are connected.

The secretary and treasurer were directed to prepare an itemized budget of expenses for 1923.

President Ward presented correspondence regarding a Sigma Xi song written and composed by a member of the Yale chapter. It was the sense of the committee that publication under private auspices would be desirable.

The committee authorized the secretary to offer for distribution insignia for active members in accordance with the present procedure for insignia for associate members, and the secretary was directed to secure prices from manufacturing jewelers.

The committee was of the opinion that there is no objection to permitting the Canadian chapters to secure insignia through a Cana-

dian jeweler, on order from the secretary, but was of opinion that it would be to the advantage of Canadian chapters to secure associate membership emblems through the authorized jeweler for the United States.

The committee agreed that it was best to encourage Canadian chapters and new chapters in the United States to use the new design of insignia for active members in accordance with the provisions of the Constitution, and the secretary was directed to inform new chapters of the constitutional provision for insignia.

In view of possible confusion of the organization of Sigma Xi with other societies bearing Greek names, it was voted that wherever possible the name "The Society of the Sigma Xi" should be accompanied by "The Society for Promotion of Research" in public prints.

The committee directed the secretary to inform all chapters of the amendment to the Constitution providing that the initiation fee should include one dollar to be sent to the general treasurer.

The secretary was directed to call the attention of the chapters to the action of the Convention upon the petition for a charter from individuals at Swarthmore College and to formulate the questions raised. (At the Toronto Convention, the Executive Committee presented the petition. The Convention voted to lay the recommendation on the table until the next convention, and in the meantime to ask the chapters to consider the new elements which the petition from this institution presented in order that action might be taken at the next convention with full understanding of the situation.)

Upon recommendation of the secretary, the committee voted the following resolution:

When recommending to the Convention favorable action on a petition for a charter, the Executive Committee shall designate the name by which the new chapter is to be known. This name shall be incorporated in the charter.

The secretary as chairman of the Fellowship Committee, called attention of the Committee to the request from the Rockefeller Foundation and General Education Board to the National Research Council to administer a system of fellowship in the medical sciences similar to those in physics and chemistry, and asked whether, in view of that addition to the work of the National Research Council, the fields of work covered by the Sigma Xi Fellowships should be further limited. The committee voted that in future announcements of the Sigma Xi Fellowships the statement should be made that in making



the award, preference would be given to workers in other fields than those of physics and chemistry and medical sciences.

The secretary presented a plan for a conference of national officers with various chapters. After full discussion, the Committee voted the following resolution:

To provide for cases in which the secretary finds visits to chapters necessary to coordinate more effectively the work of the Society, the committee authorized the payment of expense of such visits and conferences out of any funds in the treasury not necessary for meeting the expenses for the current year heretofore authorized.

The proposed revision of the Constitution was brought up for consideration by Professor Richtmyer. The committee went over the proposals paragraph by paragraph and a few changes in the wording were recommended. The committee was unanimous in its opinion that the proposals contained in this revised Constitution are of the greatest importance to the welfare and future progress of the Society. The secretary was directed to call the attention of the chapters to this proposed new Constitution in order that there may be full discussion by the chapters during the months preceding the next Convention, when the Constitution comes up for action, and that the delegates to the Convention may be fully informed regarding the proposed changes and be prepared to vote.



# CROSSING OVER, NON-DISJUNCTION, AND MUTATION IN *DROSOPHILA VIRILIS*

PRELIMINARY REPORT OF WORK DONE ON THE SIGMA XI  
FOUNDATION

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Every individual contains in each cell of its body two full sets of chromosomes, one set derived from each parent. The modern study of genetics has produced strong evidence that these chromosomes are the carriers of the hereditary factors or genes.

In the formation of the eggs and sperm, the chromosomes first come together in pairs; then each chromosome separates from its mate and the two go to different cells, so that each egg or sperm receives only one chromosome of each pair. Hence an egg or sperm contains only one set of chromosomes instead of the two sets contained in each somatic cell.

When the two chromosomes of a pair separate, each carries its genes with it and these are inherited as a group. Sometimes, however, the chromosomes before separating interchange homologous pieces, so that the resulting chromosomes carry combinations of genes different from the combinations in the original chromosomes. This interchange of homologous sections of chromosomes is termed crossing over. It is obvious that, other things being equal, the longer a portion of a chromosome, the more likely is a break or crossing over to occur within it (Morgan). Therefore the frequency with which two genes undergo recombination furnishes an index of their distance apart; and by comparing the frequencies with which different genes undergo recombination it is possible to construct a map of the chromosome, showing the relative location of the genes within it. For convenience, a unit of map distance is taken to represent one per cent of crossing over. In such maps, the arrangement of genes in the chromosome turns out to be linear (Sturtevant).

## CROSSING OVER IN *Drosophila virilis*

The study of crossing over throws light on both the make-up of the chromosomes and their behavior. With this in mind, I have

TABLE I

Females	Males													
	Single crossovers				Double crossovers				Triple crossovers				Quadruple crossovers	
	Non-crossovers													
	Region 1*	Region 2	Region 3	Region 4	1, 2	1, 3	1, 4	2, 3	2, 4	3, 4	1, 2, 3	1, 2, 4	1, 3, 4	2, 3, 4
12984	933	2309	383	691	447	108	230	152	414	54	42	118	13	21
3105														2
														9112

\*The figures in this row refer to the regions of the chromosome in which the crossing over has occurred, the regions being numbered from left to right; that is, sepiacrossveinless is region 1, crossveinless forked is region 2, etc.

been studying crossing over in the X chromosomes of *Drosophila virilis*, using the factors sepia (eye color), crossveinless (venation), forked (bristles), triangle (venation), and rugose (eye). The location of these factors in the chromosome on the basis of their percentages of recombination in this experiment is shown in the accompanying map; the data themselves are given in Table 1. Of these factors, sepia, forked, and rugose were discovered and located



by Metz (the sepia data have not yet been published); crossveinless was discovered and located by the writer. Triangle, which consists of a thickening of the cross-veins and of the ends of the longitudinal veins, is a partial dominant; it was discovered by Metz, and my data show that it is sex linked, its locus lying between forked and rugose, 8.5 units from forked and 16.9 units from rugose.

It has been said that the frequency of crossing over depends on the length of the region involved. The frequency is, however, known to be affected by other conditions. Thus, in the second chromosome of *Drosophila melanogaster*, crossing over decreases with increased age of the mother (Bridges) and increases with increase or decrease in temperature (Plough). The present experiments were all performed with flies raised at 25° C., so that if there is any temperature variation in *D. virilis*, the results represent the crossing over relations at this temperature. Most of the females were transferred to fresh culture bottles at the end of 10 days, and to a third set of bottles after 13 days more, so that three successive broods were available for comparison. The recombination percentages calculated for these broods separately, as well as for all the data together, are given in the following table.

TABLE 2

Region	Brood 1	Brood 2	Brood 3	Total Data
Sepia Crossveinless .....	20.80	21.13	20.30	20.78
Crossveinless Forked .....	38.13	39.56	37.96	38.47
Forked Triangle .....	8.47	9.04	8.32	8.51
Triangle Rugose .....	16.53	17.67	16.34	16.93

It is seen from this table that the variation in crossing over in successive broods is too small to be significant. This agrees with the situation in the X chromosome of *D. melanogaster*. The data in the table do not, however, necessarily prove that crossing over does not vary with age in *D. virilis*; for the values given are averages over rather long periods and it is possible that there was variation within each period. To test this point it is planned to transfer the females at two-day intervals so as to have a more accurate analysis of the situation. It is also planned to vary the temperature to find out whether such a change affects crossing over.

#### MULTIPLE CROSSING OVER AND COINCIDENCE

Crossing over may occur simultaneously at more than one point of a chromosome; thus an X chromosome of *D. virilis* might undergo crossing over both between sepia and crossveinless and between forked and Triangle. It has been found in *D. melanogaster* that for regions near together in a chromosome, crossing over in one region tends to prevent or interfere with crossing over in neighboring regions. In general, this interference decreases as the distance between the regions concerned becomes longer (Muller); but when the intermediate distance increases beyond a certain limit, interference increases again (Weinstein, Bridges, Gowen).

From this point of view it is of interest to study interference in *D. virilis*, particularly as the X chromosome in this species is genetically longer than in *D. melanogaster*. A measure of the interference is obtained by calculating the coincidence, which is done as in the following example. The amount of recombination for the sepia crossveinless region is about twenty-one per cent and for the forked Triangle region about nine per cent. If crossing over in one region neither helped nor hindered crossing over in the other, double crossing over involving both regions simultaneously would occur in nine per cent of twenty-one per cent of all the cases; that is, the double crossovers would amount to 1.9 per cent of all the individuals. In the present experiment the double crossovers do not come up to this expectation but amount to only 1.3 per cent of the total; that is, they are only three quarters as numerous as would be expected if there were no interference. This is expressed by saying that the coincidence is 0.75, which means that about 75 per cent of the double crossovers expected are realized. If we calculate the coinci-

dence of the sepia crossveinless and Triangle rugose regions, we find the value to be 0.72. In this case a smaller proportion of the expected number of double crossovers has been realized. This suggests that, as in *D. melanogaster*, when the intermediate distance increases beyond a certain limit, interference increases.

Of course the difference in coincidence in the two cases is not very marked and the above conclusion is only tentative. But the conclusion is borne out by the coincidence of sepia crossveinless and crossveinless forked. Here the average distance between the breaking points in double crossing over is shorter than in the other cases, and the coincidence is higher; namely, 0.84. This coincidence, moreover, is a compound value. For since the crossveinless forked distance is very long, the coincidence of its different parts with sepia crossveinless is different, the regions near sepia crossveinless having a lower coincidence than those farther away. Consequently the region just to the left of forked must have a higher coincidence than the average for the entire region, and the decline of coincidence to the right of forked must be more marked than the figures given above would indicate. This is further borne out by a calculation previously made by the writer which indicated that the coincidence of yellow crossveinless and magenta forked is about 1.4, and the coincidence of yellow vesiculated and magenta forked about 0.99.

TABLE 3

THE VALUES OF COINCIDENCE AND THE AVERAGE DISTANCES BETWEEN  
BREAKING POINTS IN DOUBLE CROSSING OVER FOR THE  
VARIOUS REGIONS IN THE EXPERIMENT

Region	Coincidence	Average distance between breaking points
Sepia crossveinless and crossveinless forked .....	0.836	29.6
Sepia crossveinless and forked triangle .....	0.752	53.1
Sepia crossveinless and triangle rugose .....	0.718	65.9
Crossveinless forked and forked triangle .....	0.728	23.5
Crossveinless forked and triangle rugose .....	0.896	36.2
Forked triangle and triangle rugose .....	0.686	12.7

For double crossing over when the breaking points are near together, coincidence is again lower. This is shown in the present data by the coincidence of forked Triangle and Triangle rugose. Here the average distance between breaking points is only 12.7 and the coincidence is 0.69.

A consideration of the coincidence data given in Table 3 and of data previously published makes it probable that the most frequent distance between breaking points in double crossing over in *D. virilis* is about 47 (but this figure must be regarded as tentative). This agrees with the figure obtained for the X chromosome in *D. melanogaster*, where the distance was found to be about 46. The value obtained for *D. virilis* represents roughly half the length of the chromosome; hence if crossing over occurs at the center of the chromosome there would still be room for crossing over at the two ends. That is, triple crossing over involving the center and the two ends should be more frequent than in *D. melanogaster*, where the X chromosome is shorter. This is actually found to be the case. The coincidence of triple crossing over involving the regions sepia crossveinless, crossveinless forked, and Triangle rugose is 0.75, which is higher than the highest value for triple crossing over reported in the X chromosome of *melanogaster*. If the crossveinless forked distance were replaced by a shorter distance at the center of the chromosome the coincidence would probably be still higher—possibly 1.00 or more, which would mean that interference had vanished or become negative.

In this connection it is of interest that two quadruple crossovers were observed in the data given in Table 1, and others have been observed in data not there included. Such crossovers have never been observed in the X chromosome of *melanogaster*; in fact, only two cases have hitherto been found—one for the second chromosome in *D. melanogaster* (Muller, unpublished data) and one for the third (Gowen).

#### NON-DISJUNCTION IN *Drosophila virilis*

Non-disjunction (Bridges) is an abnormal distribution of chromosomes (and hence of genes) due to the failure of the chromosomes to segregate at the reduction division. In such cases one daughter-cell receives both chromosomes of a pair, the other receives neither. This is termed primary non-disjunction.

When non-disjunction of the X chromosomes occurs, and an egg containing two X's is fertilized by a Y-bearing sperm, an XX Y individual results. When the eggs of this individual are formed, generally the two X's separate in reduction, the Y going with one of them. But in a certain percentage of cases the two X's go to one pole, the Y to the other. This is termed secondary non-disjunction.

In *D. virilis*, where I have been studying primary and secondary non-disjunction, the phenomena seem genetically identical with those in *D. melanogaster* and the behavior of the chromosomes is undoubtedly the same. The rate of secondary non-disjunction in *D. virilis* has been found to be 1.3 per cent (out of 1,511 flies in a non-disjunctive stock, there were 792 regular females, 700 regular males, 8 exceptional females, and 11 exceptional males). This indicates that the rate of secondary non-disjunction in *D. virilis* is somewhat lower than the rate found in other species—4.3 per cent in *D. melanogaster* (Bridges), 2.9 per cent in *simulans* (Sturtevant), 1.7 per cent in *willistoni* (Lancefield and Metz).

I am now measuring the rate of the occurrence of primary non-disjunction and have made up a stock that will render possible the detection of non-disjunction in equational as well as in reduction divisions.

When an egg-cell that has received neither X chromosome is fertilized by an X-bearing sperm, an individual results having one X and no Y. In *D. melanogaster* such individuals are known to be sterile males. In *D. virilis* I have tested a male that resulted from primary non-disjunction. This male produced no offspring although he was mated successively with six different females. If this is representative of primary non-disjunctive males in *D. virilis*, it would indicate that here, as in *D. melanogaster*, the Y chromosome carries one or more factors necessary for fertility in the male. The Y chromosome is not known to carry any other factor in *D. virilis*; in this species, as in *melanogaster*, XXY individuals seem to be females somatically indistinguishable from XX females.

#### GYNANDROMORPHS

An abnormal distribution of chromosomes may occur in a somatic division with the result that one cell, and all the cells derived from it, may come to have a chromosome complex different from that of



the other cells. Individuals in which some cells thus differ from others become mosaics or gynandromorphs.

In the work on *D. virilis*, a gynandromorph was observed which must have resulted from a loss of one of the X chromosomes in the course of development. This gynandromorph was derived from a cross of a female heterozygous for crossveinless by a forked male. The other offspring of the cross were the expected classes (wild-type females, wild-type males, and crossveinless males). In the gynandromorph, the thorax and the scutellum were forked on the right side and wild-type on the left side. Since the forked gene not only affects the bristles but also makes the thorax and scutellum glossy, the line of demarcation between the forked and the not-forked regions was very sharp. The bristles on the head were all forked. The right wing was shorter (a male character) than the left; neither wing was crossveinless. The genitalia were female.

This individual probably began as a female, having received one forked chromosome from the father and one not-forked chromosome from the mother. At an early stage in the development the not-forked chromosome must have been eliminated from one of the cells, so that the regions of the body derived from this cell showed the forked character.

#### MUTATION

It had originally been planned to utilize the linkage experiment described above for a study of the rate of mutation in *D. virilis*. A measure of the mutation rate may be obtained by noting the frequency of occurrence of sex-linked lethal factors, as has been done by Muller and Altenburg for *D. melanogaster*. The appearance of a lethal in an X chromosome of a female may be detected by a deficit of individuals in those classes of sons that receive the lethal; hence the method cannot be used where some classes are already deficient because of poor viability due to the combinations of genes they contain. Such differential inviability was present in the linkage experiment, and rendered it impossible to use the data for a determination of the rate of occurrence of lethals.

Differential inviability may be decreased by reducing the number of mutant factors used and by decreasing the crowding of larvae in the cultures. This latter can be done by transferring the parents every few days to new culture bottles. These methods will, it is hoped, eliminate the difficulty.

A number of non-lethal mutations have been observed. The inheritance of these is being studied and their loci in the chromosomes are being worked out. The mutations are as follows:

(1) A very short wing resembling the vestigial wing in *D. melanogaster* and, like the latter, an autosomal recessive.

(2) A shortening of the fifth longitudinal vein. An autosomal dominant.

(3) Spread wing. Probably autosomal.

(4) A wing with thickened veins, resembling Confluent, and like it an autosomal dominant. If this turns out to be identical with Confluent or allelomorphic to it, the case will be of interest as a recurrence of a mutation.

(5) A small wing resembling miniature and dusky in *D. melanogaster*, and like them a sex-linked recessive. The locus is about seven units to the left of forked.

Several mutations have also been observed in *D. melanogaster*.

(1) Notch. This is a sex-linked dominant with a recessive lethal effect. It is of interest because of its comparatively frequent occurrence (it has previously been observed about sixteen times) and because it seems to be due to a deficiency of genetic material in the facet locus and sometimes in one or more adjacent mutant loci (Mohr). The deficiency in the present case seems to cover the facet gene (as the facet-Notch hybrids show both characters) but no other genes. In the case of one previous Notch, the hybrids with facet were found to be sterile (Bridges). The hybrids in the present case were tested and proved fertile.

(2) A shortening of the fifth vein. The gene is recessive and located in the third chromosome.

(3) A non-sex-linked recessive (third chromosome) causing a dilution of the eye color apricot. Apricot is an allelomorph of white found by Clausen (unpublished data) and makes the eye color of both sexes about like that of the eosin male. The modifier dilutes the color, making it about as light as eosin ruby. It does not affect the wild-type eye, and its effect on the other allelomorphs is being tested.

The experiments are being continued and additional ones undertaken. It is hoped that further data will help in the solution of the problems under consideration.

## SHALL THE UNIVERSITY RECOGNIZE THE TECHNICAL SOCIETY?

By J. F. DASHIELL, *University of North Carolina*

The relationship of the university to productive research on the part of members of its teaching staff has been discussed from many angles. That the university should be interested in this and should lend encouragement is fairly generally conceded; but a certain vagueness as to ideal and certain disagreements as to means are apparent to any observer.

Conceivably the university might be interested in research for any of three reasons.

(1) It is a commonplace that the school often becomes most highly interested in the investigations of its teachers when they appear in public print. It is a further commonplace that it often seems that for university purposes an article covering considerable acreage in popular or semi-popular print is as valuable as a tersely organized report to a technical journal. It all depends upon the particular class of public that is to be impressed. It is a matter of advertising psychology.

(2) It is a common belief that the following up of productive lines of work will keep a teacher more alive to the growing aspects of his subject, fresher in his enthusiasms, more inspiring to those of his students who are not using the college as a country club, as some have called it—in a word, research makes the teacher a better teacher. This is all of a piece with the conception that the mission of the university is primarily to make available to a maximum number of youth a maximum amount of knowledge already at hand, originally obtained by means the college cares naught about.

(3) But an alternative interpretation of the function of a university in society is possible. A social group, like a human individual, potters about with a dim consciousness of certain values and still more dimly aware of its methods of aiming at them; and if the value of productive research is only hazily appreciated—even after the practical yieldings of the pure scientists in war—the methods of forwarding research are still less definitely thought of. It may be, then, that the university is one of the institutions that society is half-

unconsciously needing and using for the advancement of research work. And the institution's encouragement of its teachers' investigative work may be due to some realization of this mission.

In the pursuit of any of these ideals of research-encouragement the university is plainly in the trial-and-error stage. Of the various random efforts many have been and are being discussed by others: we will concern ourselves with one only. Unless the conception of the university as an agency for promoting the widening of the boundaries of human knowledge falls under the first head just mentioned, a vital phase of the whole matter is that the investigator must keep in touch with the advancing outposts of his field, and not merely by keeping 'read up' in the technical books and journals, but also by a frequent literal rubbing of elbows with fellow investigators in learned society conference and program. Research work by virtue of its very nature implies that the individual research man is a pioneer belonging to a vast group of scientific workers engaged in the common enterprise of exorcising the devils of ignorance; and the learned world has long been committed to the belief that the technical society is the instrument *par excellence* for the furthering of research. What then shall be the attitude of the university toward the technical society? If the research-promoting function of the former is to be interpreted as given in the second conception above, if it is interested only in the effects of a man's original work upon his general classroom attitude, then the freshened mental outlook and the renewed zest for discovery, almost uniformly consequent upon attendance at such society meetings must be reckoned with as a vital factor. But if the university counts itself as not only a distributor of knowledge but also as a genuine advancer of knowledge, attendance by its staff upon the association meetings becomes all the more a vital concern of the university's own.

An approach to the question was made in the form of a questionnaire concerning the practice of universities in this whole matter. The rules of questionnaire construction were followed as far as possible, the questions being definite and answerable in most cases by a 'yes' or 'no' written into the appropriate blank space and their number being limited. A form was mimeographed (a copy appears below) and mailed out with a personal letter to the secretaries of the thirty chapters of the Sigma Xi Society located at universities or colleges. It was thought that these secretaries were in positions

qualifying them well to know their local conditions, also to be interested in any problem of research advancement.

Of the thirty addressed, replies were received from 25. Twelve of the twenty-five replies indicated that the schools concerned did not ever in any way assist in meeting expenses of men attending learned society meetings. The attitude of these institutions—or at least the majority of them—can be fittingly quoted from the response of a certain university chancellor to whom one of the questionnaire blanks had been turned over for official answer: "In the majority of instances attendance on such functions is primarily of professional importance to the man who goes, and secondarily of importance to the university. The university therefore endeavors to select men to represent the university on such occasions as justified greater or less expense to the university by reason of the fact that the university will reap the benefit, rather than the individual as an individual." Let us remark at this point that a very delicate distinction seems called for here between "importance to the university" and "professional importance to the man," between the university's reaping the benefit and the individual reaping it "as an individual." Apparently it is assumed that between the two there is little in common; that the forwarding of the professional interests of a teacher is a matter of indifference to his school. If professors were more nomadic in their habits than they are, if appointments to university staffs were, like those of the beginning elementary school teacher in many places, for only one or two years duration as a rule, then it would be clearly a case of each for himself, the professor or the institution. But the organization of higher education in America is on a different basal plan: compared with the number of men who hold the same position for ten years or more the number of those who change is after all small; moreover, the considerations in the foreground in the appointment of a new man to an opening include some expectation of his permanency in the position, and the same conception is at the basis of current discussions of retiring allowances. If the critic would pour out the baby with the bath by asserting that the professor goes to meetings "to get a better job," he must also say that his one motive in doing creative work at all, or in publishing it even in the university's own publications, is likewise to get a better job. Encouragement of attendance at technical society sessions is all of a piece with encouragement of productive work by relief from burdensome teach-

ing schedule, by research grants, by rapid promotion, by leaves of absence, etc.

Among the thirteen institutions that have, judging from replies, given some financial assistance to teachers attending technical society meetings, two are included that has done so only in a very few sporadic cases in the past.

Only two schools assist those attending who neither present papers nor occupy official positions in the societies; and one of these makes a smaller allowance for such men.

In two institutions the whole *bona fide* expense account is paid in a few limited cases. But the item of railroad fare (usually including Pullman charges) is the most common basis for calculating expenses, there being seven schools where this item is the one met by them when any is met, there being also one other in which this is the definite recommendation by a Sigma Xi committee. In the case of the other institutions where it appears that some assistance is rendered no definite plans seem to be followed as to the types of expense items covered.

In at least three schools the assistance given is apportioned from a definite annual fund (in the one case where mentioned it was \$1,000); the source of the money in other cases being unstated.

The selection of the particular men to be assisted in attending is made on the recommendation of department heads in four cases, by committee in two cases, directly by president or dean in three cases.

That the general question we have raised is or is becoming a live one is apparent from some of the personal letters sent with returned questionnaire blanks; from the fact that at least three schools faculties or faculty committees have presented formulated requests for definite and permanent policy; and again from the fact that such definite procedure is established at three schools and described in printed form. For the sake of a contrast to the educational theory implied in the quotations from a chancellor's letter given above, we may quote here from the formal announcement of a dean at one school and from the printed regulations of the faculty at another. "The university ought to be represented at *all* important societies at frequent intervals." "Members of the faculty are urged to become members of and attend meetings of the national and state teachers' associations and of associations of teachers of their own



class. Members are also expected to attend meetings held for the promotion of the particular field in which they are engaged or interested. In order to encourage teaching efficiency and promote original and creative work among the members of the faculty, a sum is set aside to defray the expenses in whole or in part of those who are delegated to attend such meetings."

Name of institution .....

1. Does the institution ever bear part or all of the expenses of men attending meetings of technical societies (here and below we do not refer to societies of which the school is in an *institutional* sense a member)? .....
2. Does it bear part or all expenses of *all* men attending such meetings? ....
3. Does it bear part or all expenses of those who present papers or have important official duties? .....
4. Does it bear the whole *bona fide* expense account .....; one half or other fraction .....; certain items as railroad fare ....., or a daily expense allowance .....; or other form (details here appreciated) .....
5. If expenses of only some men are (at least in part) met—  
 A.—what principle of selection obtains: are the men selected on basis of departments ....., of seniority ....., or otherwise (please specify) .....?  
 B.—is the selection done by deans ....., by president ....., by committee ....., or otherwise (specify) .....

REMARKS on any points may be written on reverse side of this sheet.

6. About what is the average No. teaching hours for full professor .....; for instructor .....

Your name .....



## INSTALLATION OF THE CHAPTER AT RUTGERS COLLEGE AND THE STATE UNIVERSITY OF NEW JERSEY

The installation of the chapter was held on Friday evening, March 10, at the Hotel Klein, in New Brunswick. A dinner was served at 6:30 P. M., at which were present the members of the petitioning group, representatives from Columbia and Princeton Universities, and Dr. C. E. McClung, and Dr. Edward Ellery, representing the National Society.

After the dinner, the meeting was called to order by Temporary Chairman, Dr. T. J. Headlee, who gave an account of the events leading up to the installation. The chairman read a letter from Dr. W. H. S. Demarest, president of the college, expressing his satisfaction in the establishing of the chapter at Rutgers, and giving all good wishes for its prosperity. Dr. Headlee then turned over the meeting to Dr. Edward Ellery, secretary of the National Society, who read the petition from the local group.

The charter was presented, with appropriate remarks, by Dr. C. E. McClung, past-president of the Society, who then announced the establishing of the chapter of Sigma Xi at Rutgers College and the State University of New Jersey. Dr. McClung also officiated at the election of officers of the new chapter. The officers chosen for the coming year are:

Melville T. Cook,.....	President
Francis C. Van Dyck,.....	Vice-president
George Winchester, .....	Treasurer
P. A. van der Meulen,.....	Secretary

The new officers were installed at once by Dr. McClung. The president of the chapter, then called upon Dr. A. R. Moore, chairman of the Committee on Research, of the faculty, who replied in behalf of the Rutgers Chapter. Dr. Moore spoke in part as follows:

"There is the very great task of awakening the people of the state to a realization of the social and cultural value of pure science, the pursuit of truth for its own sake. The spirit of impartial investiga-

tion is the only spirit which will dispel prejudice and with it many of our social and political ills. It will be remembered that mediæval Europe did not find inconsistent, the elaborate scholasticism and theology of the period, with witch burning and generally barbarous attitude toward human life. The situation was cleared up only with the development of the scientific spirit on the part of the ruling classes. We also have seen witch hunting in our own day, and I am not far wrong when I say that the happy future of our land depends upon the further spread among our people and a deeper cultivation generally of the scientific method and attitude."

"We have tonight, a mere glimpse of our problems and our opportunities. We accept your charge, Mr. Secretary, with a high faith in the great future of Sigma Xi."

An address on "Cooperative Effort in Research" was delivered by Dr. C. E. McClung. The speaker traced briefly the growth of Sigma Xi, and drew attention to the great possibilities for service to science, before the society. He pointed out that the early ideals of the founders are only being realized now. The great development and diversification of the sciences has brought about the necessity for collaboration of workers in related fields. The Sigma Xi Society, through periodical meetings, and by fostering the spirit of comradeship, has done much to advance this cooperation of effort. In establishing a research fellowship, supported entirely by voluntary subscriptions of the members, the Society has taken the first step to further scientific investigation in a still more effective manner.

Brief remarks were made by Dr. Lauder W. Jones, and Dr. A. W. C. Menzies of Princeton University, and by Professor I. K. Finch, representing the Columbia Chapter.

P. A. VAN DER MEULEN, *Secretary*

INSTALLATION CEREMONIES AND DINNER,  
MCGILL CHAPTER OF THE SOCIETY  
OF THE SIGMA XI  
APRIL 13, 1922

The meeting opened at 4:45 P. M., with Dr. Henry B. Ward, president of the Society of the Sigma Xi, in the chair, and Dr. Edward Ellery, secretary of the Society of the Sigma Xi, acting as secretary of the meeting.

Present also, the following:

Dr. F. D. Adams	Dr. C. F. Martin
Dr. E. W. Archibald	Prof. C. M. McKergow
Dr. H. G. Barbour	Dr. D. A. Murray
Dr. Cyril Batho	Dr. Horst Oertel
Dr. H. S. Birkett	Dr. J. B. Porter
Dr. W. G. M. Byers	Dr. R. F. Ruttan
Dr. W. W. Chipman	G. W. Scarth, Esq.
Jacob Dolid, Esq.	Dr. A. N. Shaw
Dr. F. G. Finley	Dr. G. E. Simpson
Prof. R. DeL. French	Dr. Alfred Stansfield
Dr. J. A. Gray	Dr. R. L. Stehle
Dr. James Harkness	Dr. T. R. Waugh
Prof. F. E. Lloyd	Dr. C. T. Sullivan
Dr. L. V. King	Dr. S. E. Whitnall
Dr. A. B. Macallum	Dr. Arthur Willey
Prof. H. M. MacKay	

Dr. Ward extended the greetings of the Society of the Sigma Xi to the petitioning group at McGill, and called upon the secretary to read the petition and the record of action thereupon.

As requested, Dr. Ellery read the petition, the record of the unanimously favorable action of both the Executive Committee and the Convention of the Society of the Sigma Xi upon this petition, and closed with a few congratulatory remarks to those present.

Dr. Ward then requested all non-members of the Society of the Sigma Xi to rise, which, having been done, he read the pledge of the Society, and pronounced the petitioners admitted to full active membership in the Society, upon their giving their assent to the

pledge as read by him. Membership certificates were then delivered to the new members by the chairman, and the charter of the McGill Chapter was presented to Dr. Porter, on behalf of the petitioning group.

Dr. Porter briefly thanked the Society for the confidence it had exhibited in granting himself and his associates a charter, and promised that so far as was possible, the McGill Chapter would do all in its power to further the aims of the Society of the Sigma Xi.

Dr. Ellery then delivered the charge to the Chapter. In so doing, he sketched briefly the three stages in the history of the Society since its inception at Cornell in 1886. At first, it had admitted undergraduate members somewhat as does Phi Beta Kappa, basing their election largely upon scholastic standing, but also to some extent upon their promise of achievement. At that time, the greatest value of undergraduate membership lay in the opportunity it afforded for fellowship with older men. During the second era, undergraduate members were admitted only to associate membership, and made to prove their mettle before being granted full privileges. The third and present state was characterized by an attempt to keep the interest of the alumni members alive, by asking them to support fellowships in research. In 1921 for the first time one such fellowship had been held by a member of the Society at Columbia University, and it was the hope and expectation that two or more in addition would be soon available.

As showing the esteem in which Sigma Xi was held by the scientific world, he instanced the fact that one of the two general meetings of the American Association for the Advancement of Science at its next Convention was to be conducted entirely by the Society.

Dr. Ellery's remarks were received with loud applause.

The chairman submitted the draft by-laws to the meeting, remarking that they had been examined by himself and Dr. Ellery and were approved of.

Moved by Dr. Porter, seconded by Prof. Lloyd, and carried, that the by-laws as drafted for the use of the McGill Chapter of the Society of the Sigma Xi be adopted.

On the call of the chair, Dr. W. W. Chipman was nominated for President of the McGill Chapter by Dr. Porter, seconded by Prof. Lloyd. There being no further nominations, it was moved by Dr.

Murray, seconded by Prof. McKergow, and carried unanimously that Dr. Chipman be declared elected.

On the call of the chair, Dr. Adams proposed, Dr. Ruttan seconded, the names of Dr. A. S. Eve and Dr. J. B. Porter for the positions of Vice-presidents of the McGill Chapter. There being no further nominations, it was moved by Prof. McKergow, seconded by Prof. Lloyd, and carried unanimously that these gentlemen be declared elected.

On the call of the chair, Prof. R. DeL. French was nominated for Secretary-treasurer of the McGill Chapter by Dr. Porter, seconded by Dr. Stansfield. There being no further nominations for this office, it was moved by Prof. Lloyd, seconded by Dr. Willey and carried unanimously that Prof. French be declared elected.

On the call of the chair, Dr. H. G. Barbour, Prof. F. E. Lloyd and Dr. D. A. Murray were nominated by Dr. Porter and seconded by Dr. Whitnall, as members of the Executive Committee. There being no further nominations, it was moved by Dr. Ruttan, seconded by Dr. Whitnall, and carried unanimously that these gentlemen be declared elected.

Dr. W. W. Chipman, president-elect, was escorted to the chair by Dr. Ward and Dr. Ellery, and in a few well-chosen words, thanked his fellow-members for the honor which they had conferred upon the Faculty of Medicine and upon him personally.

Replying to the questions of several members, Dr. Ward explained the basis upon which membership in the Society might be acquired, emphasizing particularly the distinctions between associate membership and active membership.

No further business offering, the meeting adjourned *sine die* at 6:00 P. M.

The formal installation ceremonies were followed by a dinner at the Mount Royal Club at 8:00 P. M. Dr. Chipman presided as Toastmaster, and the Chapter entertained as guests Sir Arthur W. Currie, Principal of the University, Dr. Gordon Laing, Dean of the Faculty of Arts and Chairman of the Graduate School, Mr. W. M. Birks of the Board of Governors, Dr. Georges Baril of the University of Montreal, Mr. E. J. Archibald, Managing Editor of the Montreal *Star*, and Mr. R. L. Hamilton, President-elect of the Students' Council, as well as Dr. Henry B. Ward and Dr. Edward Ellery.

Dr. Chipman opened the toast-list with "The King and the President of the United States," and then called upon Dr. A. B. Macallum to propose "McGill University." After referring in humorous vein to his misfortune in not being an alumnus of McGill, Dr. Macallum spoke of the wide-spread reputation which the University enjoyed, as evidenced by many incidents personally known to him.

Principal Currie, replying to this toast, sketched the program he conceived to be the best for the future development of the University. The salient features of this program were the revising of the standards of scholarship so as to maintain the number of the student body at about its present figure, the provision of better laboratory and library facilities, and the strengthening of the instructional staff by every possible means.

The toast of "The Society of the Sigma Xi" was proposed by Dr. Porter, and responded to in an impressive address by Dr. Ward. After sketching briefly the history of the Society, Dr. Ward elaborated upon the need for research in pure science, as distinguished from commercial research. He further emphasized the improved position of the trained scientist since the war, due to the conspicuous success of this class in widely varying fields during the great struggles with the enemy. The fact was brought out that the great majority of the specialists called to the aid of the United States Government at that time were members of the Society of the Sigma Xi. Referring to the McGill Chapter, he expressed his pleasure at the consummation of a long-dormant desire for the expansion of the Society into fields without the United States, and expressed the hope that yet further gradual expansion might take place, until Sigma Xi became truly a world-wide association of "Companions in Zealous Research."

Dr. Ellery proposed "The McGill Chapter," which was replied to by Dr. F. D. Adams, dean of the Faculty of Applied Science. In his remarks, Dr. Adams outlined the University history, and mentioned the many distinguished men who had, at one time or another, been connected with it, such as Sir Willam Osler, Sir Ernest Rutherford and Sir Auckland Geddes.

"The University of Montreal," proposed by Dr. Louis V. King, was responded to by Dr. Georges Baril. Dr. Baril emphasized the desire of his institution for a closer cooperation with McGill, and

pointed out that, though McGill was closely in touch with British developments, she was so *au courant* with those of France, while the contrary was true of the University of Montreal. Thus the closer the cooperation between the two universities, the larger the field of each.

An impromptu toast to Dr. Chipman, proposed by Dr. Birkett, closed the proceedings.

*Submitted by R. DEL. FRENCH*



## THE INSTALLATION CEREMONIES AND BANQUET, KENTUCKY CHAPTER OF THE SOCIETY OF SIGMA XI, UNIVERSITY OF KENTUCKY

Dr. Henry B. Ward, national president of the Society of Sigma Xi, and Dr. Edward Ellery, dean of the faculty of Union College, Schenectady, New York, and national secretary of the Society, came to the University of Kentucky, Lexington, arriving on the morning May 5, 1922, for the purpose of installing a chapter of Sigma Xi at this institution. At 2:30 the installation exercises occurred in the Little Theater, university grounds. Doctors Ward and Ellery were met there by the following faculty members of Sigma Xi, all having been elected to the Society while connected with other educational institutions as follows: Dean P. P. Boyd, Cornell University; Dean T. P. Cooper, University of Minnesota; Prof. H. H. Downing, Chicago University; Prof. Marietta Eichelberger, University of Chicago; Prof. E. N. Fergus, Ohio State University; Dr. W. D. Funkhouser, Cornell University; Prof. E. S. Good, University of Illinois; Prof. P. E. Karraker, University of Missouri; Dr. J. G. Kemp, University of Illinois; Dr. Flora LeSturgeon, University of Chicago; Dr. Frank T. McFarland, University of Wisconsin; Dr. J. S. McHargue, Cornell University; Prof. C. W. Mathews, Cornell University; Dr. Ralph N. Maxson, Yale University; Dr. J. B. Miner, Columbia University; Dr. W. D. Valleau, University of Minnesota; Prof. G. H. Vansell, University of Kansas.

President Ward called the meeting to order and extended the greetings of the Society of Sigma Xi to the group who petitioned for a chapter to be installed at the University of Kentucky. He said that Sigma Xi had been inspiring and helpful to all institutions of learning in which it had been placed and he hoped that the Kentucky Chapter would be inspiring and helpful to the University of Kentucky. Dr. Ward then called upon Dean P. P. Boyd to read the petition of the local members to the National Convention for a Kentucky chapter. President Ward then called upon Secretary Ellery to give the decision of the recent Convention at Toronto.

Dr. Ellery announced that both the Executive Committee and the Convention of the Society of Sigma Xi at Toronto were unanimously favorable to the granting of a chapter to the University of Kentucky. President Ward then announced officially that the chapter to be installed at Kentucky shall be known as the "Kentucky Chapter." President Ward then asked Secretary Ellery to deliver the charge to the Kentucky Chapter. Dr. Ellery prefaced his remarks by saying that the Society has meant much to the research workers of the United States; that Sigma Xi had had a successful past and one could modestly judge of the character of its work in the future by what it had already done. He said that it looks now as if certain changes were taking place in the Society which would have a marked influence on the organization in the future, that these changes would make Sigma Xi larger and of far more importance than is, perhaps, now realized. It was stated that in the beginning it was in the minds of the founders of Sigma Xi to establish an organization that would be to the workers in science in our colleges and universities what Phi Beta Kappa had been to the literary, art, and cultural sides of such institutions. Formerly, scholarship was only essential to membership but this was an early fallacy because the object of the Society of Sigma Xi, according to its constitutions, was to promote research and not essentially scholastic attainments. Dr. Ellery said the society has made five steps of progress as follows:

*First*—As young chapters were formed and delegates attended National Conventions, changes began to take place and the idea that qualification for membership consisted of something more than mere grades began to take place; that the candidate must give in addition to good scholarship promise of ability to do original work. Now a man may even be elected to Sigma Xi though he have only average grades if he shows ability of independent thinking and accomplishment along scientific lines.

*Second*—The organization now has two kinds of members, one known as active members and the other known as associate members. Only those are elected to active membership who have actually done an original piece of research work. The associate members are those who give promise of doing research work in the future.

*Third*—Three or four years ago there was put to the Executive Committee the question, as to whether the constitution of the So-

ciety contained any clause to prevent the organization from extending its activities beyond the borders of the United States. After considering the matter, the Committee concluded that this was not prohibitive, and to this end a chapter has been installed out of this country, namely, at McGill University on April 13, 1922. It is reasonable to suppose that in the next quarter of a century, chapters will be organized in a number of foreign universities which are doing a high grade of research work.

*Fourth*—The fourth step in the progress of Sigma Xi was along the line of supporting research by the members financing fellowships. There are now 15,000 members of the organization and a small contribution from each would materially aid worthy students endeavoring to extend their knowledge of science. A Sigma Xi fellowship is now being financed, the appointee doing his work at Columbia University.

*Fifth*—A provision has been made for alumni representation on the National Board of officers as well as for alumni delegates at conventions.

After Dr. Ellery's address, a symposium was conducted by President Ward, resulting in the asking of many questions, the answers of which cleared up many matters not fully understood by members of the local chapter, especially with regard to the election and status of associate and active members. Dr. Ward said that experience had shown the wisdom of having associate members for the reason that in years back some men were chosen to Sigma Xi who afterwards never were interested in scientific work; some even forgetting the purpose of the organization although they were wearing the Key.

Dr. W. D. Funkhouser then read the By-laws of the Kentucky Chapter which, with some changes, were adopted.

The following officers were elected: president, Dean P. P. Boyd; vice-president, Dr. W. D. Funkhouser; secretary, Prof. E. S. Good; treasurer, Prof. E. N. Fergus. Doctor Boyd, president-elect, was escorted to the chair by Dr. Ward and Dr. Ellery, at which time he thanked these gentlemen for the gracious manner and stimulating thoughts expressed in the installation of the chapter. Dean Boyd then thanked the members for the honor bestowed upon him and said he would make every effort for the success of the Kentucky Chapter. Dr. Ward then handed Dean Boyd the charter granted the Kentucky Chapter by the National Convention.

The meeting then adjourned to a banquet held at the Phoenix Hotel, Lexington. Dean P. P. Boyd presided as Toastmaster. In addition to the members of the Kentucky Chapter, members of the Society of Sigma Xi connected with Transylvania University were present. These were Dr. A. F. Hemmingway, Dr. J. A. Gunton, and Associate Professor Mary Brown. Dr. J. A. Herring, a local physician of Lexington and a member of Sigma Xi, was also present. Dr. Phillip P. Blumenthal, also a local member, was out of the city. The guests present on the occasion were Dr. Ward, Dr. Ellery, Honorable R. C. Stoll, chairman of the Executive Committee of the University of Kentucky; Dr. Glanville Terrell, chairman of the Graduate School, University of Kentucky; Prof. W. S. Anderson, president of the Research Club, University of Kentucky; Dr. Thomas B. McCartney, acting president of Transylvania College, Lexington, Kentucky; Dr. Robert T. Hinton, Georgetown College; and Dr. Frank L. Rainey of Center College, Danville, Kentucky.

President Frank L. McVey, being away from the university, Toastmaster Boyd called on Judge R. C. Stoll to speak in behalf of the university. In well-chosen and happy remarks characteristic of Judge Stoll, he said in part that he was proud that the research work at "Old State" was of such a character as to merit a chapter of Sigma Xi, and he hoped there would be a number of men who would be successful in winning a Key—that, though he was a graduate of the University of Kentucky and Yale, the only Key he ever possessed while in college was one to a difficult text in Algebra.

In responding to his toast, Dr. Ward expressed his deep regret at the absence of President McVey saying that the University of Kentucky had made great strides since the incumbancy of Dr. McVey at its head.

In coming to Kentucky, Dr. Ward remarked that he was always reminded of Audubon, who without means went into the wilderness to find his material and published his great work, *Birds of North America*. He also was reminded of Rafinesque who did such splendid work in botany. Both of these pioneer scientists spent part of their lives in Lexington. Dr. Ward then gave a brief history of the Society. He emphasized the need of united effort in the solution of some of our research problems stating that Sigma Xi would have a large part in bringing about such action. Dr. Ellery spoke on the aims of Sigma Xi and the stimulus it gives

young men and women to do good college work. Dr. Ellery then gave a highly instructive address on how to get the best results out of our educational system. The final toast was by Dr. McCartney of Transylvania University, who spoke in behalf of the colleges, saying they were very happy at the good fortune of the University of Kentucky in obtaining a chapter of Sigma Xi.

*Submitted by E. S. GOOD*

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### A. S. M. E. MEMBERS OF SIGMA XI MEET AT LUNCHEON

On Thursday, December 8, 1921, about fifty members of Sigma Xi met at luncheon in Brown's Chop House. This group was made up of members of the American Society of Mechanical Engineers who were attending the Annual Meeting of the Society in New York.

The luncheon took place after a meeting of the Research Conference of the Society which was held under the chairmanship of Dr. Arthur M. Greene, Jr., of Rensselaer Polytechnic Institute. The afternoon session was a joint session with the Society for the Promotion of Engineering Education and the subject discussed was "Professional Engineering Education for the Industries."

Among those present at the luncheon was Dean George B. Pegram of Columbia University; Professor Dugald C. Jackson, M. I. T.; Dr. Arthur M. Greene, Jr., R. P. I.; Professor Joseph W. Roe, New York University; Spencer Miller and Fred A. Halsey.

It is planned to continue this event at succeeding Annual Meetings of the Society.

*Submitted by C. E. DAVIES,  
Assistant Secretary A. S. M. E.*

# CHAPTER OFFICERS

LIST FURNISHED BY THE CORRESPONDING SECRETARIES OF THE CHAPTERS

CHAPTER	PRESIDENT	VICE-PRESIDENT	SECRETARY	TREASURER
Cornell.....	S. Simpson.....	T. R. Briggs.....	A. H. Wright....	O. A. Johannsen
Rensselaer....	M. A. Hunter....	R. B. Bourne....	E. M. Clark.....	W. J. Williams
Union.....	C. F. Garis.....	J. N. Vedder....	M. F. Sayre.....	M. F. Sayre
Kansas.....	F. E. Kester.....	G. E. Coghill....	C. M. Sterling... H. E. Jordan	
Yale.....	G. A. Baitsell... S. J. Record....	F. L. Troxell....	A. H. Smith	
Minnesota....	R. E. Scammon..	R. A. Gortner....	A. T. Henrici....	F. K. Butters
Nebraska.....	D. D. Whitney... Leunis Van Es..	E. N. Anderson..	M. G. Gaba	
Ohio.....	R. C. Osburn....	M. Hollingsworth.....	C. A. Norman....	T. G. Phillips
Pennsylvania..	O. L. Shinn.....	W. C. Farabee....	H. C. Barker....	H. S. Colton
Brown.....	P. H. Mitchell..	R. F. Chambers..	R. F. Borden....	C. H. Currier
Iowa.....	H. L. Rietz.....	L. P. Sieg.....	C. H. Farr.....	J. F. Reilly
Stanford.....	A. F. Rogers....	P. E. Swain.....	J. E. Coover....	
California....	G. N. Lewis....	Frank Daniel....	D. R. Hoagland..	A. C. Alvarez
Columbia.....	J. K. Finch.....	W. I. Slichter... Harold A. Fales	Harold A. Fales	
Chicago.....	F. R. Moulton..	A. J. Carlson....	C. R. Moore.....	C. R. Moore
Michigan.....	John C. Parker..	A. F. Shull.....	P. O. Okkelberg..	A. J. Decker
Illinois.....	J. B. Shaw.....	R. Adams.....	H. J. Van Cleave..	F. B. Seely
Case.....	W. R. Veasey....	C. D. Hodgeman..	R. C. Hummel....	T. M. Focke
Indiana.....	Will Scott.....	M. E. Hufford....	C. A. Malott....	C. E. Edmonson
Missouri.....	C. W. Greene....	R. H. Baker.....	C. R. Moulton....	O. R. Johnson
Colorado.....	R. D. Crawford..	Ivan E. Wallin..	Paul M. Dean....	F. S. Bauer
Northwestern	C. B. Atwell....	F. C. Whitmore..	A. E. Cole.....	M. B. Fuller
Syracuse.....	O. W. H. Mitchell.....	C. C. Adams....	L. C. Petry.....	H. F. A. Meier
Wisconsin.....	V. Lenher.....	O. P. Watts.....	G. W. Keitt.....	H. W. March
University of Washington	S. H. Anderson..	J. C. Rathbun....	A. F. Carpenter..	T. G. Thompson
Worcester....	H. P. Fairfield..	M. Masius.....	A. J. Knight.....	C. D. Knight
Purdue.....	A. N. Topping... R. H. Carr.....	H. S. Jackson....	T. E. Mason	
Washington University..	G. T. Moore....	M. T. Burrows..	P. R. Rider.....	L. Pyle
District of Columbia...	Paul Bartsch....	J. Warren Smith	M. C. Hall.....	L. E. Whittemore
Texas.....	C. Hartman....	B. C. Tharp....	C. T. Gray.....	H. J. Ettlinger
Mayo Foundation..	W. C. Kendall....	W. C. MacCarty..	T. B. Magath....	T. B. Magath
North Carolina.....	J. H. Pratt.....		J. M. Bell.....	
North Dakota..	R. T. Young....	B. J. Spence....	B. J. Clawson....	B. J. Clawson
Rutgers.....	M. T. Cook.....	F. C. Van Dyck..	P. A. van der Meulen.....	G. Winchester
McGill.....	W. W. Chipman..	A. S. Eve J. B. Porter....	R. D. French....	R. D. French
Kentucky....	P. P. Boyd.....	W. D. Funkhouser.....	E. S. Good.....	E. N. Fergus

Offices of Recording and Corresponding Secretary combined according to advice of Convention with the exception of Yale and Texas in which chapters only the Corresponding Secretary is listed.

List corrected up to June 1, 1922.



## OFFICIAL ANNOUNCEMENTS

Associate membership emblems can be secured only by order from the chapter secretary to the national secretary. All orders must be prepaid. Special order blanks sent on request.

QUARTER CENTURY RECORD AND HISTORY bound in electric blue cloth. 1886-1911. 7,500 names. 550 pp. \$2.50.

## SIGMA XI PUBLICATIONS

QUARTERLY, Volumes 1-7, 1913-19, four numbers each, unbound, 50 cents per each volume. Forwarded prepaid on receipt of draft or money order in payment of the amount indicated.

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Those ordering a complete set of the QUARTERLY and HISTORY will receive in addition until the supply is exhausted without extra cost a copy of each of the Proceedings of the early Conventions as follows:

Seventh (Philadelphia) Convention. 1904. Pamphlet. 15 pp.

Eighth (New York) Convention. 1906. Pamphlet. 7 pp.

Ninth (Chicago) Convention. 1908. Pamphlet. 14 pp.

Tenth (Baltimore) Convention. 1909. Pamphlet. 6 pp.

Eleventh (Boston) Convention. 1909. Pamphlet. 16 pp.

Twelfth (Minneapolis) Convention. 1910. Pamphlet. 27 pp.

Thirteenth (Washington) Convention. 1911. Pamphlet. 27 pp.

Later conventions are reported in the QUARTERLY.

## PRINTED BLANKS

The General Convention has instructed the Secretary to forward to chapters under the following stipulations:

Membership Certificates, stamped with the great seal of the Society. In packages of fifty prepaid, on advance payment of \$2.50 for each package. Please specify carefully whether for regular or associate members.

Index Cards, provided a duplicate set be sent for the general index of the Society maintained in the secretary's office. Gratis.

## MAILING LISTS FOR THE QUARTERLY

Chapter secretaries are requested to furnish a correct list of mailing addresses of active members for the printer. Blank forms, Gratis on demand.

The mailing list should be sent early in September and be valid for the academic year. All changes of address and all other correspondence should be addressed to the Secretary of Sigma Xi, Edward Ellery, Union College, Schenectady, N. Y.